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South Florida microfungi: a new species of *Ellisembia* (hyphomycetes) with new records from the U.S.A.

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Abstract — *Ellisembia mercadoi* sp. nov., collected on rachides of dead leaves of *Sabal palmetto* in southwestern Florida, U.S.A., is described and illustrated. The fungus is characterized by cylindrical, determinate conidiogenous cells and verruculose, subfusiform to narrowly obclavate or obclavate-rostrate, 7–16 distoseptate conidia often with remnants of an apical mucilaginous sheath. Similarities and differences with morphologically related species within the genus are discussed. *Berkleasmium leonense*, *Ceratosporella basibicellularia*, *Hermatomyces tucumanensis*, *Monodictys capensis*, and *Selenosporella perramosa* are newly recorded from the U.S.A.

Key words — anamorphic fungi, palm fungi, *Sporidesmium*, taxonomy

Introduction

The southern tip of the Florida peninsula, with its humid subtropical climate, extensive habitat diversity, and distinctive vegetation that includes a high percentage of tropical plant species, is likely to harbor a rich but still under-explored mycobiota. In the course of our continuing studies on saprobic microfungi occurring in the area, particularly those hyphomycetous anamorphs associated with dead plant debris (Delgado 2008a, b, 2009, 2010), a distinct and unusual species of *Ellisembia* Subram. was found. The fungus agrees well with the generic concept originally introduced by Subramanian (1992) for *Sporidesmium*-like taxa with distoseptate conidia and conidiophores with or without proliferating conidiogenous cells. However, it differs morphologically from previously described *Ellisembia* species and therefore is proposed here as new. Five other hyphomycetes are also recorded for the first time from the U.S.A.

Materials & methods

Samples of dead leaves belonging to two palm tree species commonly found in south Florida, the cabbage palm (*Sabal palmetto* (Walter) Lodd. ex Schult. & Schult.

f.,) and the Everglades or paurotis palm (*Acoelorrhaphe wrightii* (Griseb. & H. Wendl.) H. Wendl. ex Becc.) were collected in forested areas of Broward and Collier counties during 2007–2010. They were cut in smaller pieces, air-dried, and placed in plastic bags for further processing and examination following Cannon & Sutton (2004). Slides were prepped using lacto-cotton blue as mounting medium. Fungal structures were examined, measured at 1000×, and photographed using an Olympus BX-45 microscope. All specimens examined, including the type specimen of *Ellisembia mercadoi* as well as semi-permanent slides, are deposited in the U.S. National Fungus Collections Herbarium (BPI).

Taxonomy

Ellisembia mercadoi G. Delgado, **sp. nov.** Figs 1–9

MycoBank MB# 804032

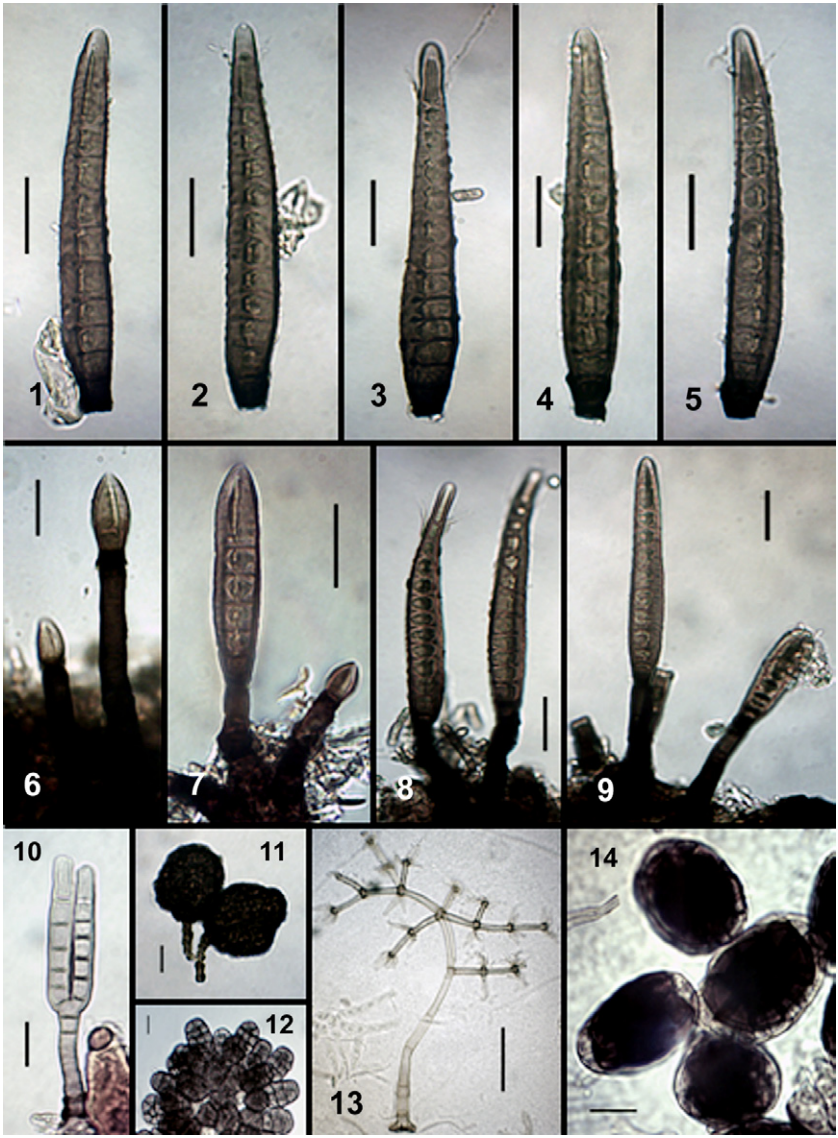
Differs from *Ellisembia fusiformis* in having cylindrical conidiogenous cells and longer verruculose, brown, obclavate-rostrate, conidia with an apical mucilaginous sheath, and from *E. crassispora* in having smaller conidia, determinate conidiogenous cells, and shorter conidiophores.

Type — U.S.A. Florida, Collier Co., Naples, 26°3′35″N 81°41′43″W, on rachis of dead leaf of *Sabal palmetto*, 23.XI.2007, coll. G. Delgado (**Holotype:** BPI 880515F).

Etymology — Latin, *mercadoi*, in honor of the Cuban mycologist Dr. Angel Mercado-Sierra (1937–2008) for his many contributions to the study of tropical and worldwide hyphomycetes.

Colonies on natural substrate effuse, hairy, inconspicuous. Mycelium predominantly immersed in the substrate, composed of branched, septate, smooth-walled, pale brown to brown hyphae, 1–2.5 µm wide. Stromata none or rudimentary, dark brown to blackish brown. Conidiophores macronematous, mononematous, single or aggregated in small groups, simple, erect, straight or flexuous, cylindrical, 2–5-septate, smooth, dark brown to dark reddish brown, 33–76 × 6–9 µm, 10–14 µm wide at the swollen base. Conidiogenous cells monoblastic, integrated, terminal, cylindrical, determinate, dark brown to dark reddish brown; apex truncate, often darkened. Conidial secession schizolytic. Conidia holoblastic, solitary, dry, acrogenous, straight or slightly curved, subfusiform to narrowly obclavate, older conidia often obclavate-rostrate, 7–16-distoseptate, sometimes abruptly constricted at one distoseptum, brown, paler toward the apex, verruculose, 63–168 × 12–15 µm; apex usually rounded or slightly acute and often with remnants of an apical mucilaginous sheath; basal cell conico-truncate, dark brown to black. Teleomorph unknown.

Additional specimen examined — **U.S.A. Florida**, Collier Co., Naples, 26°3′35″N 81°41′43″W, on rachides of dead leaves of *Sabal palmetto*, 23.XI.2007, coll. G. Delgado (BPI 880521L).



Figs 1–14. ***Ellisembia mercadoi*** (holotype, BPI 880515F): 1–5. Conidia. 6. Conidium initials. 7. Young conidia. 8–9. Conidiophores and conidia. ***Ceratosporella basibicellularia*** (BPI 884153A): 10. Conidiophore and conidium. ***Monodictys capensis*** (BPI 880518D): 11. Conidiophores and conidia. ***Berkleasmium leonense*** (BPI 884154G): 12. Sporodochium with conidia. ***Selenosporella perramosa*** (BPI 884156D): 13. Conidiophore, conidiogenous cells and conidia. ***Hermatomyces tucumanensis*** (BPI 884154D): 14. Conidia. Scale bars: 1–8 = 20 µm; 9 = 15 µm; 10–12; 13 = 30 µm; 14 = 10 µm.

Discussion

The genus *Ellisembia* has recently undergone numerous additions (Ma et al. 2008, 2010, 2011, McKenzie 2010, Rajeshkumar et al. 2012, Ren et al. 2012, Santa Izabel et al. 2013) totaling 59 entries in the Mycobank Database (www.mycobank.org). Wu & Zhuang (2005), however, had previously enlarged the original concept of Subramanian (1992) after placing *Imicles* Shoemaker & Hambl. (= *Imimyces* A. Hern. Gut. & B. Sutton) (Shoemaker & Hambleton 2001) into synonymy with *Ellisembia*. Consequently, a small group of additional *Sporidesmium*-like taxa producing lageniform, doliiform, or ovoid percurrent proliferations and distoseptate conidia could be transferred to *Ellisembia* following this broad concept, but only three combinations were formally made: *E. bambusae* (M.B. Ellis) W.P. Wu, *E. carrii* (Morgan-Jones) W.P. Wu, and *E. leptospora* (Sacc. & Roum.) W.P. Wu. This left three species in *Imicles* (*I. aquatica* (Cabello et al.) Shoemaker & Hambl., *I. heterocateniformis* (Matsush.) Shoemaker & Hambl., *I. pseudobambusae* (P.M. Kirk) Shoemaker & Hambl.) and one in *Imimyces* (*I. hollowayensis* A. Hern. Gut. & B. Sutton (Hernandez-Gutierrez & Sutton 1997) as possible members of *Ellisembia*. Seifert et al. (2011), however, retained *Imicles* as a separate genus, and in the case of *I. heterocateniformis* (≡ *Sporidesmium heterocateniforme* Matsush.) (Hernandez-Gutierrez & Sutton 1997, Matsushima 1987), a reexamination of the type specimen is certainly necessary to clarify its correct taxonomic placement.

Ellisembia mercadoi is characterized by dark brown to dark reddish brown, cylindrical conidiophores often arising from a rudimentary stroma and producing determinate, not proliferating, conidiogenous cells. The conidium initial is distinctly mitriform, pale brown, and delimited by an incipient black basal cell with the outer wall apparently showing signs of breakage resembling longitudinal splits from the pointed apex downwards. After elongation, the young conidia become cylindrical or subcylindrical with a slightly acute apex, and when fully developed they are usually subfusiform or narrowly obclavate but also obclavate-rostrate with a well-defined conico-truncate basal cell. Remnants of an apical mucilaginous sheath were often visible near the conidial apex as traces of mucilage or as short, lateral and subapical, thread-like filaments. A well defined cap as seen in many other *Ellisembia* species (McKenzie 1995, Wu & Zhuang 2005) was not observed, although further collections may provide evidence of its presence.

Among the accepted *Ellisembia* species, *E. mercadoi* is morphologically similar to *E. fusiformis* (Nees & T. Nees) Subram. (Ellis 1958) in conidial shape and width, number of septa, the presence of a black conico-truncate basal cell, and determinate conidiogenous cells. However, *E. fusiformis* has dark reddish brown smooth-walled non-rostrate shorter conidia (≤136 µm long) without an apical mucilaginous sheath, and the conidiogenous cells are not darkened and

taper abruptly toward the apex. *Ellisembia crassispora* (M.B. Ellis) Subram. (Ellis 1958, Wu & Zhuang 2005) also has verruculose, obclavate and rostrate conidia with a conico-truncate basal cell but clearly differs in longer conidiophores (≤300 µm long) with up to 3 percurrent proliferations and dark brown to blackish brown larger conidia (100–250 × 18–30 µm) with up to 22 distosepta and also lacking a mucilaginous sheath.

Additional new records from U.S.A.

Berkleasmium leonense M.B. Ellis, More Dematiaceous Hyphomycetes: 69, 1976. Fig. 12

Specimen examined: **U.S.A.. Florida**, Broward Co., Plantation, Plantation Heritage Park, Anne Kolb Memorial Trail, 26°6′25″N 80°13′19″W, on rachides of dead leaves of *Acoelorrhaphe wrightii*, 30.V.2010, coll. G. Delgado (BPI 884154G).

Ceratosporella basibicellularia Matsush., Matsush. Mycol. Mem. 7: 45, 1993. Fig. 10

Specimen examined: **U.S.A.. Florida**, Broward Co., Plantation, Plantation Heritage Park, Anne Kolb Memorial Trail, 26°6′25″N 80°13′19″W, on petiole of dead leaf of *Acoelorrhaphe wrightii* and overgrowing the surface of old hysterothecia, 30.V.2010, coll. G. Delgado (BPI 884153A).

Hermatomyces tucumanensis Speg., Anal. Mus. nac. Hist. nat. B. Aires 13: 446, 1911. Fig. 14

Specimen examined: **U.S.A.. Florida**, Broward Co., Plantation, Plantation Heritage Park, Anne Kolb Memorial Trail, 26°6′25″N 80°13′19″W, on rachides of dead leaves of *Acoelorrhaphe wrightii*, 30.V.2010, coll. G. Delgado (BPI 884154D).

Monodictys capensis R.C. Sinclair, Boshoff & Eicker, Mycotaxon 59: 359, 1996. Fig. 11

Specimens examined: **U.S.A.. Florida**, Collier Co., Naples, 26°3′35″N 81°41′43″W, on rachides of dead leaves of *Sabal palmetto*, 23.XI.2007, coll. G. Delgado (BPI 880518D, 880521E, 880515C); Broward Co., Plantation, Plantation Heritage Park, Anne Kolb Memorial Trail, 26°6′25″N 80°13′19″W, on rachides and petioles of dead leaves of *Acoelorrhaphe wrightii*, 30.V.2010, coll. G. Delgado (BPI 884154F, 884155A).

Selenosporella perramosa (W.B. Kendr. & R.F. Castañeda) R.F. Castañeda, Mycotaxon 109: 69, 2009. Fig. 13

Specimens examined: **U.S.A.. Florida**, Broward Co., Plantation, Plantation Heritage Park, Anne Kolb Memorial Trail, 26°6′25″N 80°13′19″W, on rachides, petiole, petiole-lamina junction and segments of dead leaves of *Acoelorrhaphe wrightii*, 30.V.2010, coll. G. Delgado (BPI 884151C, 884152D, 884154B, 884156D).

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